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PULMONARY PROBLEMS

ANNUAL MEETING OCTOBER 15
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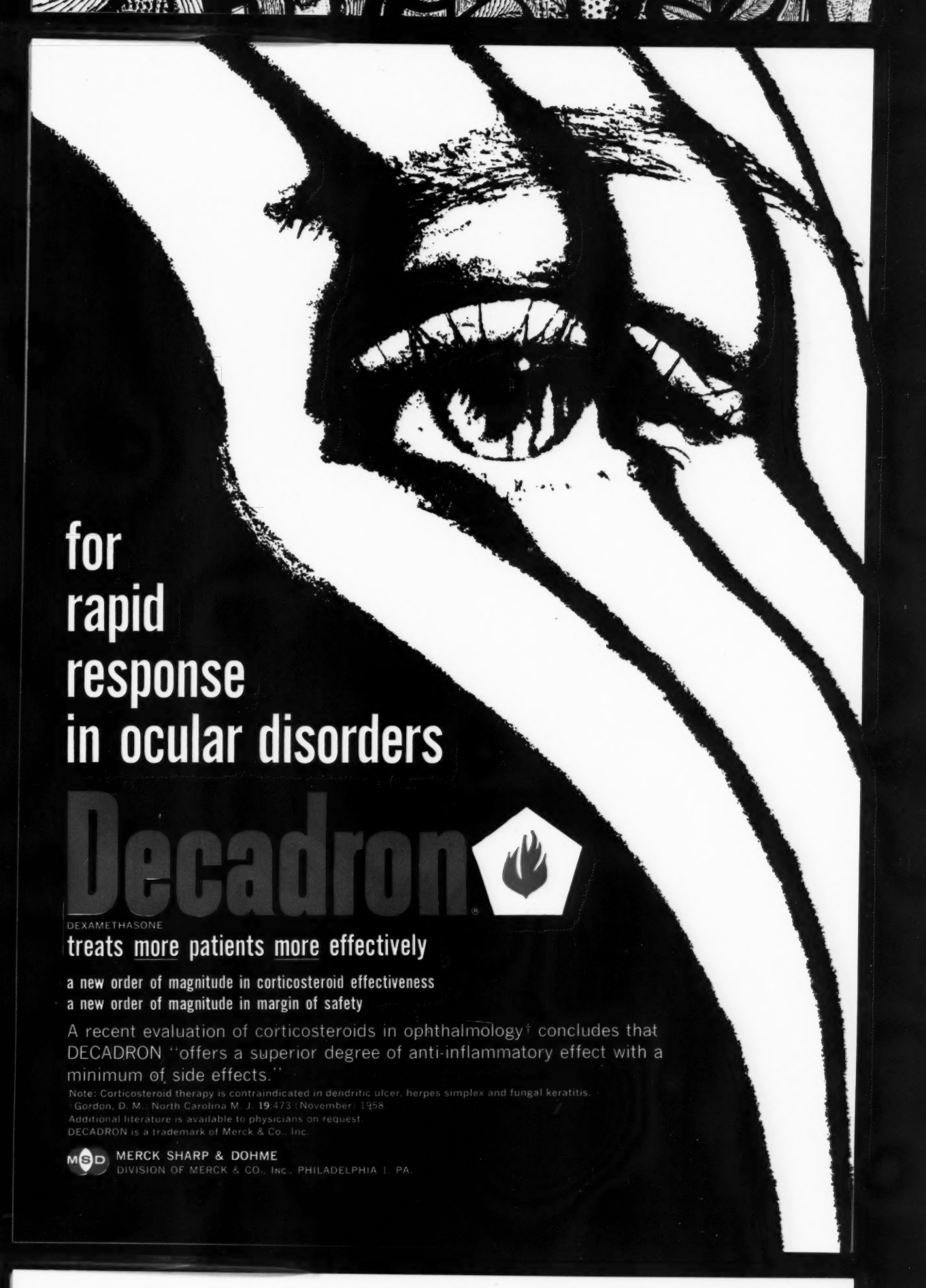
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(1) Ernst, E. M., and Snyder, A. M.: Pennsylvania M. J. *61*:355, 1958.

(2) Preisig, R., and Landman, M. E.: Am. Pract. & Digest Treat. *9*:740, 1958.

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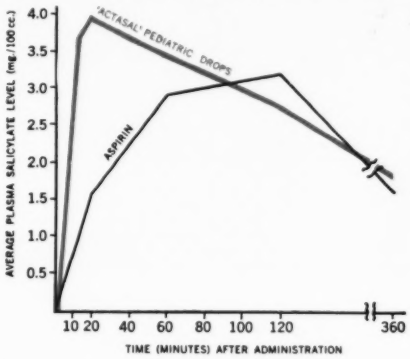

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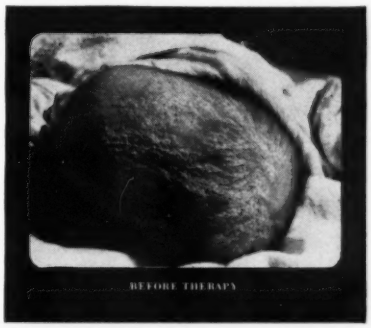

Bialkin, G.: Scientific Exhibit, American Academy of General Practice, San Francisco, April 6-9, 1959.

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Bialkin, G.: A New Anti-Seborrheic Agent in Pediatric Practice. Arch. of Ped. (to be published).

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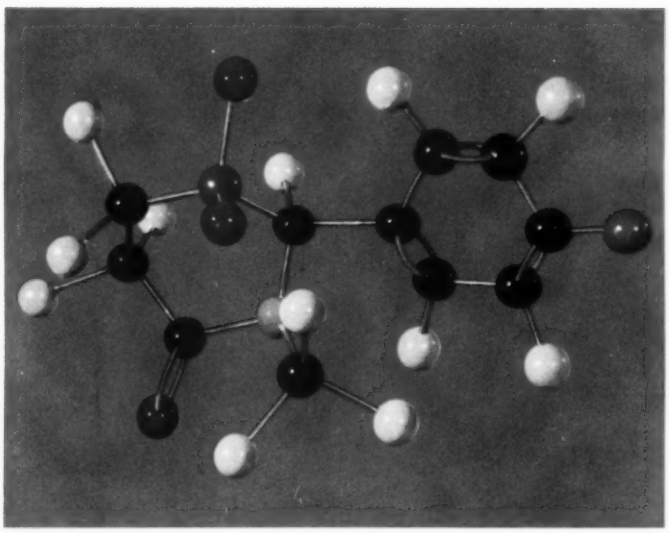

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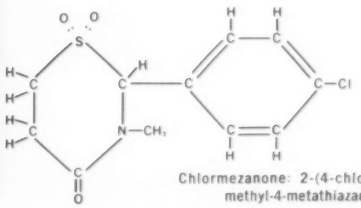

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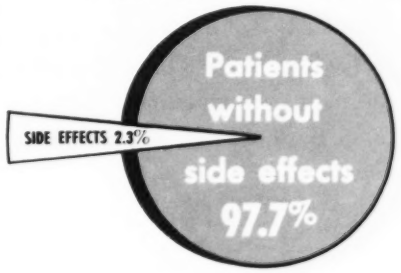

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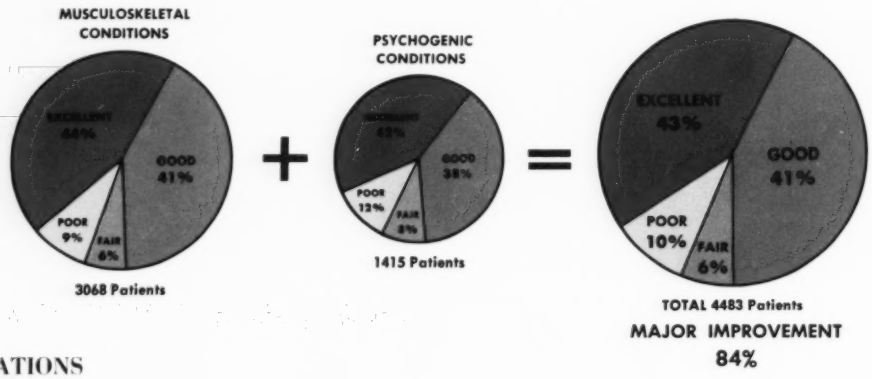

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References: 1. Collective Study, Department of Medical Research, Winthrop Laboratories. • 2. Ganz, S.E.: J. Indiana M. A. In press. • 3. Lichtman, A.L.: Kentucky Acad. Gen. Pract. J. 4:28, Oct., 1958.

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1. Editorial: New England J. Med. 258:48, 1958.
2. Vinnicombe, J.: Antibiotic Med. & Clin. Ther. 5:474, 1958.
3. Sheth, U. K., et al.: Ibid., p. 604, 1958.

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VOLUME 31 JUNE, 1959 NUMBER 6

PULMONARY PROBLEMS: A PANEL DISCUSSION*

I. The Management of Pulmonary Malilgnancies by SYLVAN H. EISMAN, M.D.†

II. Pulmonary Function Studies in Diagnosis and Prognosis by ROBERT L. MAYOCK, M.D.‡

III. Sensitivity Tests to Antibiotics in Clinical Practice by ELWOOD L. FOLTZ, M.D.§

I think you know Dr. Gerald Beatty.

Dr. Eisman will discuss "The Management of Pulmonary Malignancies," Dr. Mayock will speak on "Pulmonary Function Studies in Diagnosis and Prognosis" and Dr. Foltz will speak on "Sensitivity Tests to Antibiotics in Clinical Practice." I will turn the panel over to Dr. Beatty.

Dr. Beatty: I would first like to ask Dr. Eisman to speak on "Management of Pulmonary Malignancies."

Dr. Sylvan H. Eisman: Most of my discussion will be concerned with the chemotherapeutic and medical management of the inoperable carcinoma of the lung. As you can appreciate, the incidence of carcinoma of the lung is definitely on the increase, and it is becoming a more and more serious problem to the practitioner.

My surgical colleagues have asked me to make a plea for early diagnosis and early exploration in a patient suspected of having a bronchogenic carcinoma. Often we wait for the x-ray findings to make the diagnosis for us by following them along until the opportunity of resectability has passed and then we are forced, of course, to rely on palliative measures such as x-radiation and chemotherapeutic agents.

One of the most common problems in diagnosis is the patient with so-called virus pneumonia, which never seems to clear. This is by no means meant to imply that everybody with a virus or bronchial cold has bronchopneumonia, but many of us have seen patients who have developed a pulmonary infection (or so it appears) with fever, and x-ray findings of an infiltrate which, as we follow it, never seems to completely go away. This should raise our index of suspicion highly with regard to the possibility of there being an underlying tumor present.

With regard to the coin lesion, the isolated nodule that is found in the chest, generally asymptomatic, this is generally the best type of patient to get with regard to curing bronchogenic pneumonia. Generally if we wait for hemoptysis or pain due to pleural involvement, we have again passed the period of resectability. Often bronhogenic carcinoma presents itself first by a distant metastasis. We have seen all kinds of peculiar clinical presentations. We have seen all kinds of peculiar clinical presentations. We have seen purpura as being the first manifestation of the disease due to invasion of the bone marrow with malignant cells and subsequent thrombocytopenia. Many of us have seen patients admitted to the orthopedic section of the hospital with low back pain or pain in the leg due to metastatic lesion before the primary tumor in the lung makes itself evident. For many years it has been a rule among all neurosurgeons that given a patient who is suspected of having a brain tumor, they must never get to the operating table before

* From the School of Medicine, University of Pennsylvania. Presented at the Annual Meeting of the Medical Society of Delaware, October 2, 1958. Stenographic notes not edited by the individual authors.
† Associate Professor of Clinical Medicine
‡ Associate Professor of Clinical Medicine
§ Assistant Professor of Medicine

having a chest x-ray because often the first evidence of the bronchogenic tumor is some central nervous system disorder due to a metastatic lesion.

One final word about diagnosis, and this has to do with the contraindications for surgery that can be pretty well established on clinical grounds alone: It is my feeling that the presence of fluid, of pleural effusion with a carcinoma of the lung, whether or not you can demonstrate malignant cells, means inoperability. There have been some heroic attempts made to strip the parietal pleura under these circumstances, but the end result has been quite unsuccessful. So that the thoracic surgeons now, given a patient suspected of having a bronchogenic tumor and who has a pleural effusion, consider the case inoperable.

The same thing is true where you have involvement of the recurrent laryngeal nerve. This is essentially also in the inoperable category. There is one exception perhaps to nerve involvement, and that is where the phrenic on the left side is involved. When you fluoroscope a patient and ask him to sniff and look for paradoxical motion of the diaphragm, one can often demonstrate paralysis of the phrenic nerve on one side. This generally will mean inoperability. However, if the tumor catches the phrenic nerve as it passes down over the pericardium, under some circumstances the surgeon is able to resect the tumor. Therefore, a positive sniff test does not necessarily mean inoperability.

Finally there are a few patients who have had a congenital paralysis of one hemidiaphragm and will show a positive sniff test on fluoroscopy. This does not necessarily mean they have a carcinoma or that the carcinoma, if it be present, has involved the phrenic nerve. Distant metastasis like supraclavicular lymph nodes and x-ray evidence of bony spread, obviously are contraindications for surgery.

Let us consider some of the measures that the internist has to offer with regard to the inoperable patient, because the figures are still discouraging. The five-year survival rate of carcinoma of the lung in operated patients is under 10 per cent, perhaps closer to 5 per cent. The percentage of five-year cures in resectable cases is a little higher but is still far from satisfactory. Therefore, we are faced with an increasing number of people with inoperable carcinoma of the lung who are getting into all sorts of difficulties, apart from distant metastasis to bones, to the lumbar spine or thoracic spine or metastasis to the brain.

One serious problem is the superior caval syndrome, obstruction of the superior vena cava, due either to direct invasion of the vessel by tumor or compression of the superior vena-cava by tumor or lymph nodes containing metastatic disease. It can be a distressing problem for the patient, not just a swelling of the neck, face and hands that ensues, but the real obstruction that takes place in the trachea from edema and compression of tumor so that breathing and talking become difficult.

We have some fair degree of success, temporarily. None of the things I shall mention are curative but degrees of palliation and a certain percentage of palliation has been achieved by the judicious use of x-ray therapy, combined with or separately used with nitrogen mustard intravenously. We generally have given nitrogen mustard on the basis of three-tenths, even up to six-tenths of a milligram per kilogram of body weight in one injection, and after the usual hematologic response, in other words, the leukopenia that ensues about 7 to 14 days after the treatment, one can repeat this again. In some instances, if you alternate x-radiation to the mediastinum with courses of nitrogen mustard, we sometimes see that the nitrogen mustard seems to potentiate the effect of x-ray, and in perhaps 25 to 30 per cent of these patients there is a sufficient reduction in the size of the tumor to relieve the edema and compression that has taken place.

Syptomatic relief for cough and dyspnea due to carcinoma of the lung, as well as pain involving the pleura or ribs, requires

therapy and x-radiation has something to offer.

Another major problem that needs to be faced in these patients is the management of the recurrent pleural effusion that frequently occurs. It is distressing, to the patient to fill up with 1500 to 2000 cc. of fluid in one hemithorax every three or four weeks. Each time that you do a thoracentesis you run the risk of introducing infection into the pleural cavity as well as inconveniencing the patient and causing him a certain amount of stress.

Attempts have been made for a number of years to devise means of reducing the need for recurrent tapping. Initially radioactive gold, Au 198, was used intrapleurally and about 50 per cent of patients would get an adhesive pleuritis and enough reaction on the miliary nodules that were seated along the pleura to prevent recurrent effusion. This is still a satisfactory way of preventing effusion, but there are a number of difficulties involved. First, when using radioactive materials, you need complete equipment. Secondly, the material is expensive. Thirdly, it is not readily available. You have to order it specially, and it requires a certain number of safety measures to the operator who is injecting it into the pleural space.

So, for a number of years the use of nitrogen mustard directly into the pleural space has been employed. Again in about 50 per cent of patients the necessity for recurrent tapping is diminished or eliminated entirely. This does not necessarily apply only to bronchogenic carcinoma. It has been successful in patients with breast cancer, with recurrent pleural effusion and ovarian cancer, and even with gastrointestinal disease that has spread to the lung and pleura. It has been our usual technique to drain the chest as dry as possible through an ordinary 15 or 16 gauge needle.

Some people have used larger needles and introduced a small polyvinyl catheter through the needle leaving the catheter in place for several hours, getting the tip of the catheter down into the costo-phrenic sac as low as possible and draining the chest completed dry. It is not necessary to drain the chest cavity dry because one would prefer to have a little fluid left to act as a menstruum, to distribute the material after it is injected.

We leave 200 or 300 cc.; then, making sure that the needle is still in the pleural space (because the mustard is dangerous if it gets within the lung tissue itself or slips out beyond the pleura) 20 to 30 milligrams of nitrogen mustard is injected through the needle into the pleural cavity and followed with 50 or 100 cc. of saline. The needle is withdrawn and the patient rotated in his own bed by changing his position every 30 seconds for the next 15 minutes. By that time the mustard is fixed and further motion is unnecessary.

In some instances this has reduced the need of tapping from every two or three weeks to, in one case I know, indefinitely. If the fluid is particularly bloody under the circumstances there is a good possibility that there will be a fair amount of absorption of nitrogen mustard into the systemic circulation, and one has to watch the blood count just as he would using nitrogen mustard intravenously. If the fluid is relatively clear, the chances of hematologic effect or depression are small. Most people get enough to become a little nauseous and sometimes vomiting lasts for four to six hours, but this is not really a problem. Nitrogen mustard is readily available to all of us, it is inexpensive and the procedure can be done simply.

One word of caution: about 48 or 72 hours later one frequently sees an active recurrent effusion. This is perhaps a good sign because it represents a chemical or an irritative pleuritis with effusion. If you tap this and remove the fluid within a couple of days after the installation the chances are not bad that you have been able to cause enough adhesive pleuritis and fibrinous pleuritis to seal off the cavity and prevent the recurrence of effusion.

Finally, one last word, and this has to do with the newer chemotherapeutic agents

for the treatment of inoperable malignancy. Nitrogen mustard has been the prototype of a great many agents. We are currently working with other agents obtained from Germany of which nitrogen mustard is the first, which seem to have promise in producing palliation. They have a broader safety range. The therapeutic and toxic range of nitrogen mustard is unfortunately close, but we have been able to use some of other agents intravenously at weekly injections. We are able to use them sometimes for many months, and in some instances we have kept the tumor from growing, although certainly in most instances we have not caused much change in size. However we have but a few dramatic results, and where there has been distant metastasis without any x-radiation there has been relief from pain with the use of these agents.

Other groups of drugs will be used eventually. Certain of the antibiotics are being studied but this is still in the experimental area.

In relation to an adjuvant program of combined chemotherapy and surgery at the time of operation for carcinoma of the lung, there is underway in a number of medical schools and teaching institutions a program to study the effect or efficiency of combining chemotherapy at the time of operation. If we have a person in the operating room who appears to have a resectable lesion, the patient is randomized. Some are control cases and others, according to the card that is drawn for the particular patient, are put in the adjuvant program. They are given a tenth of a milligram of nitrogen mustard intravenously on the day of operation and the same dose is repeated for the next two days. While the chest cavity is open, a similar dose (a tenth of a milligram of mustard per kilo of body weight) is injected into the pleural space and washed around with saline, and the chest cavity is closed. The statisticians tell us that within two years they will have had enough experience collected to decide whether or not this program has improved the survival rate in patients with resectable carcinoma of the lung. The study is just under way, it is not yet a year old. Perhaps in a couple of years we can give a follow-up on it.

Thank you.

Dr. Beatty: Thank you very much Dr. Eisman.

Now I would like to call on Dr. Mayock, who will discuss a subject that is very interesting to us, "Pulmonary Function Studies in Diagnosis and Prognosis."

Dr. Robert L. Mayock: Many physicians are disappointed with the results of pulmonary function studies. I believe that this disappointment oftentimes is a reflection of the fact that the physician expects more from the studies than the studies are able to give.

I thought rather than go into the techniques of pulmonary function studies that I would consider three things with you: First, what pulmonary function studies can not do. Second, what pulmonary function studies can do. Third, patients for whom it would be advisable to obtain pulmonary function studies. For the practicing physician, medical man, internist, general practitioner or surgeon, these are the things we have to deal with most and the techniques, although able to be performed in our offices, oftentimes are performed elsewhere, in the hospital or in a large center.

First, what pulmonary function studies can not do. Pulmonary function studies can not give a bacteriologic, pathologic or anatomic diagnosis. This comes as a shock, I know, when we hope to obtain more from the studies than we are able to do. Pulmonary function studies can tell us, however, what perimeter of pulmonary function is disturbed and can give us a quantitative answer in terms of an actual number. I will say more about that later.

If airway obstruction is present due either to a tumor, emphysema or bronchial asthma, one will see exactly the same findings on the pulmonary function studies.

Therefore, one often can not decide which might be causing the actual difficulty that is detected.

Another finding might be that of the presence of an arteriovenous shunt with venous blood entering the arterial circulation. This shunt obviously could be through the lung itself, as we have in pulmonary arteriovenous fistula. It could be through the heart, or it could be through a consolidated area of lung due to ordinary lobar-pneumonia. Similarly, if one detects that the stiffness is present in the lung as we determine by other studies, the stiffness could be due to Hamman-Rich syndrome, sarcoidosis or fibrosis from pulmonary tuberculosis.

In addition to not being able to give us the diagnosis in the sense that we ordinarly think of it but rather only in terms of functions arrangement, pulmonary function can not detect localized disease if the disease is small. If you have a patient with minimal tuberculosis but otherwise healthy lungs there will be no abnormality of pulmonary findings. If blebs are present on the apices of both lungs, it is difficult, unless the blebs are large, to detect them. They can be detected only by a special technique available in only two or three institutions in the country.

Therefore, if the disease is extremely localized and does not affect the overall function of the lung, no abnormalities will be noted. There are circumstances, however, where the bronchogenic carcinoma that I mentioned before is producing tracheal obstruction. In this case, there will be interference with the airway and a resultant abnormality which can be detected. If the anatomic lesion happens to be strategically placed it is sometimes possible to obtain evidence of difficulty, but not otherwise.

What can pulmonary functions do? What can we get from the studies so far as the management of patients is concerned? As I said before, basically they tell us what perimenter of pulmonary function is deranged, and they will give us a quantitative answer in terms of the number. The numerical answer given usually is repeatable. If you do a series of vital capacities they will be within the same range, within perhaps 10 per cent if the patient is cooperative and in the same physiologic state. This is something that we can compare not only with examinations done on other patients but also with examinations on the same patient and, therefore, it can be of help in prognosis and follow-up of either the progress of the disease or the effects of therapy.

It is important to recognize what aspect of pulmonary function is affected because any physiologic treatment that is given must be given on the basis of the physiological abnormality that is produced. For instance, if we have cyanosis with polycythemia present and on study it is found to be due to a hypo-ventilation syndrome because of obesity and excessive work of respiration, it would be treated in an entirely different fashion from the same cyanosis with polycythemia present in a patient with obstructive pulmonary emphysema.

If therapy is to be on the basis of physiologic changes, toward which we are heading more and more, rather than the use of the same measures in the treatment of every patient, then one must know exactly the difficulty that is present. For instance, it may be possible to improve ventilation, especially in an acute situation, with narcosis. If the difficulty is due to depression of the respiratory center mechanical assists of respiration will be of benefit.

Other difficulties with ventilation can often be treated as in obesity syndrome; simple loss of weight will cure the patient's syndrome.

Airway obstruction can be relieved, if it is localized. This can be done by bronchoscopic techniques; if more diffused and generalized, bronchial dilators, either systemically or aerosol, are given. Positive pressure will often relieve the obstruction and completely aid the patient.

The diffusion difficulty produced by sarcoidosis responds to steroid therapy. We

may have the same diffusion difficulty produced by miliary tuberculosis which would respond to treatment with the drugs ordinarily used in the management of tuberculosis. The recognition of this difficulty is of prime importance so far as the patient is concerned.

Another thing that pulmonary function can do is provide an evaluation for the response to therapy. If one obtains base line studies in an individual—even simple studies such as the vital capacity, second vital capacity, maximum breathing capacity—and institutes therapy, he has by repeating these studies, an objective measure of the patient's response rather than a subjective one. We know the importance of the subjective impression, but following treatment for tuberculosis one obtains a follow-up x-ray. It is advisable in evaluating the patient as a whole to determine his response to therapy by repeating the perimeter of pulmonary function which is found abnormal, whether it be ventilation or measurement of the air flow or diffusion or of compliance. Similarly you can obtain an evalution of the response to treatment.

Another thing it can be used for more immediately is to determine the reversability of certain components of pulmonary function abnormalities, such as air flow resistance. In patients with asthma it is often of interest to know how much wheezing and airway obstruction is due to asthma and how much to an underlying emphysema secondary to the asthma. This can be found by giving the patients broncho-dilators following a base line set of pulmonary function studies. The response can be evaluated and the amount of permanent damage to the airways can be estimated. Frequently this involves the use of steroids in addition, but one can obtain some estimation of permanent damage as opposed to the reversible broncho spasm seen in simple asthma.

Another use for pulmonary function studies is the detection of malingering. This is particularly important in medico-legal work where one is dealing with a patient whose subjective response frequently will decide whether or not they obtain disability. We see it occasionally in patients who are psychiatric problems, who complain of dyspnea and one is unable to obtain any clinical evidence of the reason for it. But often a malingerer can be detected by having a relatively normal set of pulmonary function studies. In industrial patients with exposure to dust and fumes in which symptoms are supposedly on the basis of pneumonoconiosis, one can separate the exact degree of pulmonary function involvement.

When are pulmonary function studies indicated so far as the average physician is concerned? This is hard to state categorically, but I would like to say that I think that whenever the patient's symptoms can not be adequately explained by the clinical picture the patient should have pulmonary function studies. That is, if you have a patient with excessive cyanosis and a minimal amount of pulmonary emphysema and feel it is beyond what one would expect for that amount of disease, it is worthwhile to determine whether some other abnormality is not present which may be amenable to therapy.

In the evaluation of the patient clinically one uses the standard history, physical examination and chest x-ray, and the amount of pulmonary function studies varies depending on facilities available at the institution or in the office. But I think that any patient in whom we feel that we do not have an adequate and satisfactory explanation for symptoms should have function studies.

Often other abnormalities are suspected in individuals. One will suspect that two diseases may be present in the same individual. For instance, a patient may be dyspneic because of cardiac disease and because of x-ray changes or other findings pulmonary disease may seem to be present. It is possible to determine fairly accurately today, with the more advanced techniques of testing, how much is due to simple congestive failure and how much is due to other types of pulmonary disease.

Other indications for pulmonary function testing would be, as I have mentioned before, as a base line for therapy. I think patients with emphysema should have base

line studies of a simple nature. You take an x-ray routinely, do a history and a physical, and it is just about as easy to get the vital capacity and the time vital capacity since they usually are available in the doctor's office or nearby.

The most dramatic probable use for the pulmonary function study is the evaluation of patients for surgery. Obviously every patient who is having a pulmonary operation does not need complete pulmonary function studies, although it is routine in most institutions during thoracic surgery. If someone is able to run a mile, he could stand operation on either lung without difficulty because this involves a tremendous amount of pulmonary function. Therefore, patients ordinarily in good health and without any clinical evidence of pulmonary disease can stand surgery on either lung without difficulty in most instances. But any patient who has evidence of a diffuse emphysema—and I am speaking of obstructive pulmonary emphysema—which we see often in older individuals, should have pulmonary function studies designed to determine whether not following surgery they will have enough pulmonary function to be able to survive. We have all seen pulmonary crimes produced by the resection of a carcinoma which at best has a 5 to 10 per cent five-year survival rate. I think the refusal of this patient for surgery would be more charitable since they frequently will live for long periods of time as a complete pulmonary invalid.

I did not discuss pulmonary function study techniques today because the time available is too short. Average studies can be done in the physician's office, and anyone interested in the techniques can learn them with a little practice and study.

Thank you.

Dr. Beatty: Thank you, Dr. Mayock.

Dr. Beatty: Now I would like to ask Dr. Foltz to discuss, "Sensitivity Tests to Antibiotics in Clinical Practice."

Dr. Elwood L. Foltz: Dr. Mayock has just described the reasons for using objective tests in the measurement of pulmonary function. We are all acquainted with the fact that sensitivity tests are supposed to give us objective information as to how best to treat respiratory infections, or infections anywhere else in the body. This has been an attractive approach to the problem of managing chemotherapy or antibiotics, but I think we have experienced a keen disappointment in the failure of laboratory tests to agree with the clinical results. I should like to point out some of the reasons for this and the inadequacy of certain sensitivity tests as they are performed at the present time.

The role of the sensitivity test at best is only qualitative. It can only begin to tell you what is the drug of choice or what drugs might be used to advantage. It does not guarantee a successful outcome so far as the treatment of disease is concerned. The physician must be careful not to get into the habit of prescribing drugs and disregarding what he has in the way of bacteriology.

The common method of performing sensitivity tests in most hospitals is known as the disc method in which either tablets or paper pellets are impregnated with antibiotics and placed on an agar plate in which a strain of the particular affected organism has been spread by usual bacteriologic techniques. By incubating this plate with various antibiotic discs one gets inhibition or intensification of growth. What is wrong with this sensitivity disc method? One is limited to concentrations and drugs which can be kept in a relatively dry state on the disc or tablet. Some discs are prepared over a long period of time, or stored so that at the time of performance of the test the concentration may be far from the stated potency. Also, there is a great variation among manufacturers. We have found as much as 40 to 100 per cent variation in the stated content of some of these discs. This has been such a problem that in Canada the process of disc manufacture has come under government control, and during the past summer it was scrutinized by our own Food and Drug Administration in Washington. There is some hope of trying to get a standardized technique of producing these discs or pellets.

Also, in order to have antimicrobial activity as the result of placing these discs on the agar, there has to be dissolution of the antibiotic and dispersion or distribution of that antibiotic over the surface of the agar plate. The amount of diffusion will vary depending on the wetness of the agar, the compressibility of the tablet or how quickly this material can be put into solution.

Much confusion arises as to how much inhibition there must be before one can say that the drug is effective. We do not like this method, and those who are enchanted by its ease of performance and the rapidity with which the test can be done have tried to overcome some of the shortcomings by using filter paper discs which are freshly impregnated at the time of the test with a water or saline solution containing the antibiotic. This gets around part of the problem so far as density of the disc material, but we are still confronted with the problem of interpreting a zone size indicating whether this particular antibiotic is effective or not.

The best method available at present is known as a two-fold tube dilution technique which starts out with a relatively high concentration of the antibiotic. By diluting it down, half, as you progress down the series of tubes, you get varying concentrations. Let us assume, for example, that we start out with tetracycline with a concentration of 50 micrograms per ml. We would have 15, 12½, 6.25 and so on down until we had the final of a ten-tube series containing a fraction of a microgram per ml. We inoculate this entire series of tubes with the same number of organisms, and find that turbidity after 16 to 24 hours of growth will indicate the concentrations at which this particular organism can grow in spite of the presence of the antibiotic. We would notice that there is a little growth in one particular tube but another appears clear. That would be the concentration then at which we would hope to effectively control the infection with this particular organism.

As for some of the techniques, a compromise in the whole situation is known as the pour plate method, in which the antibiotic is incorporated directly into the blood agar. One takes a loop full of a culture media with the organism and streaks it on the plate and watches after incubation for inhibition. Sometime, on a control plate with a control organism, you will notice that there are some staphylococci and mucoid colonies that are characteristic of Gram negative infections. On exposure to penicillin you will notice that the three staphylococci are not inhibited by this particular concentration. There is partial inhibition, but we would still call this resistant because many colonies are growing. An absence of growth would suggest that this particular organism is inhibited. There is apparently some inhibition of a sensitive proteus.

The difficulty with this method is that it is more time-consuming. Also, we have no control over the number of organisms that we plate out on each streak. Furthermore, there are variations in antibiotic sensitivity because these have to be prepared fresh. They cannot be kept more than three or four days under ideal refrigeration conditions. On the other hand, so far as we are concerned, and I think most centers agree, this affords us with the most reliable method for doing fairly large numbers of sensitivity tests.

Now, what are some of the results that you can get from such a test?

We have to choose a level that is attainable in the body. We tested the adbsorption of tetracycline, given five-tenth of a gram every six hours to normal male medical students at our university a few years ago. After 48 hours we achieved approximately a level of five micrograms per ml. in the serum of tetracycline. Now, if one tests for sensitivity it should be in relationship to the blood levels because the body fluids as a whole, with the exception of urine, have no ability to concentrate this drug. I should include bile in this, but none of these fluids has the ability to concentrate the antibiotic above that which is found in the serum. Therefore you can expect tissue levels to be lower than this.

It makes little sense then to test tetracyclines at 10 or 25 micrograms per ml. when this concentration is relatively unattainable with the average methods of dosage. So one has to choose a concentration at which to test antibiotics in relation to the pharmacologic properties of each of them, and what levels can be obtained in the blood.

Suppose we are dealing with the two so-called bactericidal agents, penicillin and streptomycin, one unit of which can easily be obtained by oral therapy and the average injection of between 300,000 and 600,000 of procaine penicillin. Five units requires vigorous intramuscular therapy, about 300,000 units every three to four hours around the clock.

We have found that micrococcus pyogenes are not very sensitive to penicillin; about 25 to 30 per cent are sensitive at these particular concentrations. With streptomycin the results are a little better. Taking the Gram negative organisms as a whole there is little activity against these organisms by penicillin. On the other hand, streptomycin is effective against Aerobacter, of which Friedlander's bacillus is a first cousin. In fact, we now consider Aerobacter and Friedlander's together. We then can say that about 20 per cent of the Friedlander's Aerobacter group will respond to streptomycin at this concentration. 55 per cent of common coli should respond to streptomycin. Proteus does not do too well; the various proteus species gave only about 17 per cent response. Pseudomonas is generally resistant to streptomycin, and alcaligenes has a relatively low order of sensitivity.

Chloramphenicol is quite effective against the micrococcus pyogenes. I do not want to leave with you the impression we still have 95 per cent sensitivity in our hospitals. The figures are now down to 75 per cent as a result of the invasion of epidemic strain in the past year and a half. The figures for the tetracyclines have fallen off more, down to less than 50 per cent at the present time.

Proteus, largely responsive to Chloramphenical and Pseudomonas failing to respond to most of these broad spectrums, limits one primarily to the use of polymyxin or to special combinations to take care of these particular organisms.

Alcaligenes responds fairly well to chloramphenicol and slightly less well to the tetracyclines.

This in brief is the sort of data one should have because I feel that chemotherapy should be instituted immediately upon knowing that you are dealing with a bacterial infection. Perhaps the most important piece of evidence to obtain initially is a smear or some information as to the nature of the organism with which you are dealing. If you get a sputum smear, one can not, on the basis of finding a pneumococcus, a streptococcus, or hemophilus organisms, completely ignore the sensitivity tests because one knows right from the start that most of these organisms are quite susceptible to penicillin or chloramphenicol or a combination of these two. He can forget about the sensitivity tests. Sensitivity tests should be reserved for those organisms particularly in pulmonary infection where we suspect a gram-negative organism or where the staphylococcus is our offending organism.

One should not depend entirely on an inferior method such as the disc method for the selection of drugs, but should choose the drug that is most likely to give a response and treat with full doses as rapidly as possible. The evidence obtained from sensitivity methods should back you up in your initial choice of the drug. Anyone who waits for sensitivity results is deluding himself that he will be in a better position to select a drug adequately for the management of infections.

Therefore, I would come back to the basic problem; that in the management of pulmonary infections, the common varities of pneumococci, streptococci, and hemophilus are so susceptible to the antibiotics that it is not necessary to do the sensitivity tests. Secondly, when you do have an organism such as a gram-negative rod or the staphylococcus, one should use the drugs that statistically in large collected series, or knowing your own local problem ex-

tremely well, are most likely to give adequate results and use sensitivity tests as a qualitative guide in backing up your decision so far as antibiotics or any other antimicrobial is concerned.

I have completely ignored the newer antibiotics, or some of the less commonly used ones. Certainly erythromycin and novobiocin can be mentioned for management of gram infection. More recently kannomycin, bacitracin and polymyxin have established places for themselves in the management of gram-negative infections or some of the more resistant gram-positive infections. But these are special cases. I think what we are concerned with as practicing physicians is a basic approach to the commonly used antibiotics, and I hope I have shown you why the sensitivity tests do not necessarily always agree with your clinical results.

Dr. Beatty: I am sure you have some interesting questions to direct to the panel. The floor is open.

Dr. O'Brien: I would like to ask Dr. Eisman about the chemotherapeutic agents used for carcinoma of the lung, as to whether he feels that they have prolonged the lives of individuals with inoperable carcinoma and whether the hospitalization and the cost to the patient for that period of time is better than using morphine at home, or some less exepensive agent for a lesion that we know is going to end fatally for the patient, and whether there is some proof that the chemotherapeutic agents actually help in the survival and the general clinical evaluation of the patient.

Dr. Eisman: Your point is well taken, Doctor. It probably is true that so far as duration of survival alone is concerned, there is not much significant increase at the present time. However, when the agent is effective, the time left the patient to be alive is certainly much more tolerable and useful. The other part of the question has to do with cost and hospitalization. Most patients we are treating on an out-patient basis. They have been coming to the clinic at weekly intervals for an injection.

A carcinoma of the lung was treated with nitrogen mustard after the first of April and there was a dramatic response made about four weeks later. This remission was the expected clinical improvement, as you would imagine in cough and dyspnea. This diagnosis had been made on a superclivicar lymphnode and was bronchogenic carcinoma. The improvement lasted about 17 weeks, or four months. The four months that he was free of symptons after this course of therapy was a very comfortable period for him.

I suspect that the duration of life itself hasn't been significantly increased, although it has been increased a little. But many of these patients are being treated on an out-patient basis, and hospitalization is not used except when absolutely necessary.

Dr. Mayock: I think we ought to point out that the study that Dr. Eisman is supervising so far as the University of Pennsylvania is concerned on this adjuvant program will solve this problem for us probably in two years, according to our statisticians, and I think everybody connected with the chest has often wondered whether the gain was worth the gamble. I think we will have an answer not only in surgery but also, when you consider that these people are basically carcinoma patients, we will be able to tell whether the control versus the treated series was actually aided, which we are all anxious to know.

Dr. Beatty: Are there any other questions?

Dr. Frelich: I wonder if Dr. Eisman would have any comments on how to avoid carcinoma of the lung, or a prophylactic approach to it, in relation to smoking.

Dr. Eisman: I shouldn't get into it while I am smoking here. *Res ipsa loquitur.* I suspect that much of the data is real and should be accepted since, as you well know, there is a good deal of investigation going on as to whether it is the tobacco at all, whether it has to do with the arsenic content of the soil in which the tobacco grows, whether it has to do with the composition of the cigarette paper, and so forth and so on.

I suspect that in essence if we cut out smoking we would certainly reduce the incidence of carcinoma of the lung. By the

same token there must be other factors, too. For example I think in the pitchblende miners in Czechoslovakia, the incidence of carcinoma of the lung runs 80 per cent of the people who have worked there for a period of time. This has nothing to do with whether they smoke or not. So that there are other exogenous agents besides tobacco.

I don't think one can honestly say that long, continued use of cigarettes has nothing to do with carcinoma of the lung. I just can't stop it myself.

Dr. Beatty: Are there any other questions?

Dr. Frelich: I wonder if Dr. Mayock would give us a little better rundown on what type of pulmonary function studies he thinks would be advisable to have in the office for example.

Dr. Mayock: Yes, I would be glad to. There are many institutions in America that do bilateral pulmonary surgery and have no established pulmonary function unit. These are largely tuberculosis hospitals. The survival rate and production of pulmonary invalids is no less than any other institutions in the country. It runs about the same. This I think is a tribute to what can be done with very simple pulmonary function studies. In evaluating pulmonary function studies, however, one must take an overall approach to the problem, the history of the patient, cough, dysmea, especially dysmea is extremely important; the physical evidences of pulmonary disease, areas of fine scattered rales, especially after the pertussive maneuver, are important in evaluating exactly what the patient's overall lung picture is. Often following tuberculosis the disease will clear, but one will be left with an area of rales which is the result of damage done to the lung. This would be some hazard, especially if it were on the side that the patient was supposed to survive on after the other lung has been removed.

The history and physical examination are first and foremost in the evaluation of the patient. The next important step, is fluoroscopy of the chest, done by someone trained in dynamic fluoroscopy. As you know, we don't use the fluoroscope for inspection of the chest basically, if we are using it correctly today, in view of the radiation hazard. I think it is being overemphasized in relation to its importance, but it still is important, and so long as we don't have to use radiation, I feel that we shouldn't. But a dynamic fleuroscopy of the chest—and by that I mean a careful examination as to the mechanics of the chest—one can, by noting the motion of the rib cage as opposed to the diaphragm, detect exactly how much function is present. The vital capacity depends on two things: One is the elevation of the chest cage and the other is the dropping down of the diaphragm. And you have to see that under the fluoroscope if it is there. If it is not there, the person isn't ventilating. So you can estimate how much ventilation is occurring on each side almost as well as with bronchospirometry.

The detection of a paralyzed diaphragm by the sniffing test is helpful. If one has a patient take a maximum inspiration and a fast expiration, he can detect airway obstruction, shifting of mediastinum, localizing the areas of trapping. If you have a patient blow out rapidly during this period, you have done a one-and-three-second vital capacity because they can only blow out as fast as the thoracic cage can move. So, the fluoroscopy I would place second.

Simply done is the vital capacity, confirming what you have established with your hands, stethoscope and fluoroscope. They should all fit together. If they don't, there is something wrong with either the patient's cooperation or your estimation and you should recheck yourself.

The one-and-three-second vital capacity will detect the actual patency of the airways. One normally blows out 81 per cent of one's breath in one second and 100 per cent in three seconds. This can be visible and audible by all types of methods. You can see how fast the airway is able to empty.

If you have done those studies the main problem left that you will not have an-

swered is the distribution of gas to areas which are receiving blood that they can exchange with. This usually goes with the airway obstruction, however, and it is unusual to have an area of lung which is not profused and is ventilated, and vice versa. They usually both go down together. The diffusion problems are ordinarily recognizable on the simple PA of the chest. If there is something blocking between the capillary and the alveoli, under ordinary circumstances it is visible on the x-ray as a diffuse process or linear strands.

Diffusion studies in the office are not necessary. If you think, "does this patient have a diffusion problem?" and go over the situation so far as the modalities that we have talked about, you almost always can determine it and make a good guess as to whether or not they are present.

The maximum breathing capacity I think is important and easy to do in the office by some of the newer techniques because it gives you an overall estimation of the patient's ability to perform. It is about like running the mile. They have a very good maximum breathing capacity, it takes many things into account that one would have to test for individually, and if it is down it indicates there is something wrong with the previous evaluation.

Going beyond that, I think a CO2 saturation, content, which is available in every hospital is an easy thing to do, hematocrit to determine whether or not polycytemia is present with enough oxygen saturation.

If you have these as a base line, going on to arterial gas studies involves a complicated team. If you want to determine diffusion compliance, airway resistance by the newer body plethysmographic studies, you get into a more advanced situation where you need a good pulmonary function laboratory.

I would like to emphasize that many institutions do bilateral surgery and evaluate the lungs by these simple methods and are able to do good surgery and have a high survival rate.

Dr. Young: Would you emphasize that fluoroscopy isn't a cursory procedure but requires proper acclimitation of the eyes and time spent on it?

Dr. Mayock: Yes, indeed. I think without acclimitation of the eyes in terms of adaptation one is not only wasting his time, but it is difficult to get a satisfactory examination. If the test is worthwhile, if the exposure is worthwhile in terms of the test, it should be done properly.

Dr. Beatty: I think because of the lack of further time we will have to terminate the question period. Thank you, gentlemen of the panel, for this very interesting discussion, and we appreciaate your coming down from Philadelphia to help us out.

President Baker: I want to thank you Dr. Beatty, and you three gentlemen for this very interesting discussion. We appreciate it.

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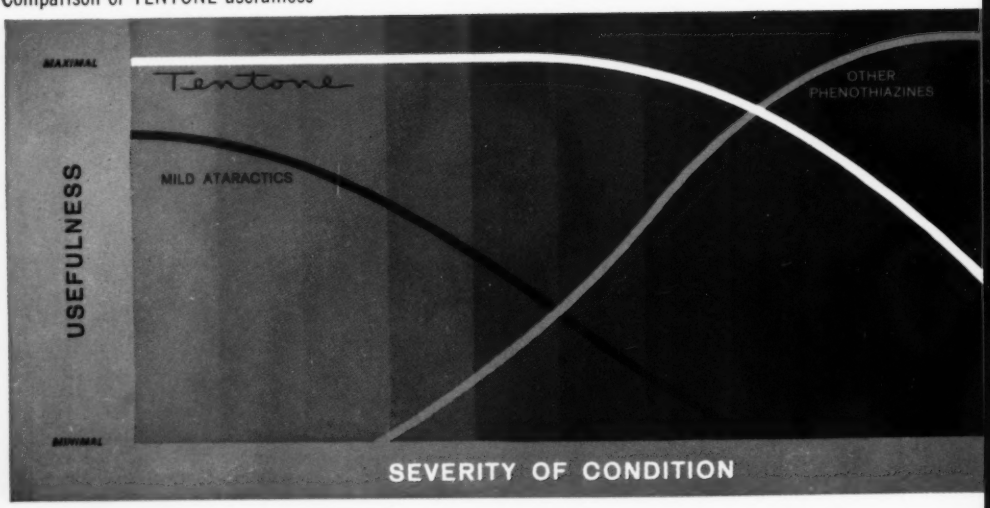

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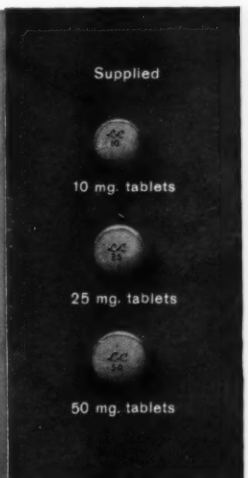

NORTHERN EUROPEAN MEDICINE AND INSURANCE

CHARLES T. PACE, M.D.

No American fails to be impressed by a trip to Europe. The museums, geography, history, and famous names and places are powerful stimuli. What excites the greatest interest in the tourist, though, is comparing differences between our young American culture and its older predecessor.

More than 6,000 years ago a race of people called Nordics, speaking a Teutonic language, appeared in Germany. Later on they migrated into Holland, England, Denmark, Norway, and Sweden, and after some fantastic and violent adventures have popu lated the United States, Canada, Australia, New Zealand, and South Africa. They have developed the highest culture in history and have set the pace, right or wrong, for what we call modern civilization.

Let us compare two branches of the family, the American and European.

The European branch is a mature society; the American a young one. Europeans are more civilized, more settled, more sophisticated, and better educated than we. This is true in all social levels; for example, illiteracy is non-exsistent in Holland and Scandinavia. They are better disciplined—child and adult—than we; more formal, more inhibited, less impulsive, and less friendly than we in the United States.

They spend their time in different pursuits; generally ours are passive, theirs active. We look at television and movies; they read. Every village in Northern Europe has a good bookstore. We like spectator sports; they like participation sports. All ages and kinds of people engage in outdoor exercise—walking, hiking, camping, bicycling, skating, and skiing.

Another impression one brings from Europe is that our greater material wealth is of no importance in assessing individual worthiness and national character. In fact, it may be a delusion serving to corrupt rather than strengthen.

The most striking difference between Northern Europe and North America is economic. The United States, in spite of accelerating federal encroachment, is still a relatively free country. Our economy is more flexible, government control is not nearly so rigid, and we produce more of everything for everybody. The paradox is that we are moving toward the state ownership system—a system which produces less.

This fact holds true for medicine and insurance as it does for the remainder of our economy. In examining Europe we shall see where this process has run full course. Government administration of medical care and insurance is established in the countries of Northern Europe. Let us look at them one at a time.

GREAT BRITAIN

The capacity to suffer without complaint, to accept adversity calmly, is the hallmark of the British. It characterized their conduct during the War, and again, after the War when a socialist government appropriated and disturbed many segments of the economy. Medicine was one of these, and that this program has functioned as well as it has is more a tribute to the British doctors than to the efficiency of the system.

Prior to 1948 medical care was run on about the same basis as it is here. People had private doctors who charged a fee only if the patient was able to pay. Hospitals were run in the same manner and administered by physicians who charged nothing for their services. Hospitals without internes were staffed by local physicians on a rotating call service for emergencies and for patients who had no private doctor. Parliament voted for "free" medicine and, although the doctors were almost unani-

mously opposed, there was no attempt at revolt or strike; in fact, they made every effort to co-operate. Without the enormous financial subsidy of the United States this program would never have been installed. It cost four times what its socialist proponents said it would in annual cost, and the expense has risen each year so that the health, welfare, and social insurance schemes in Great Britain now occupy 20 per cent of the annual budget.

This program includes doctor, hospital, mid-wife (many in Europe; few in United States) nursing, dentistry, spectacles, drugs, ambulance service, and home nursing care.

The program is called "insurance." The employed pay 1.50 per week, the employer contributes 1.20 per week for a total of 2.70. (Remember that in Britain salaries are 50-75 per cent lower than in the U. S.). This sum pays only a fraction of the total cost: 4/5 of the cost comes from taxes (mostly income tax). The beneficiary pays only 12 per cent of the cost of his own care. So, despite its name, it is not insurance.

Each citizen in Britain has a card which he presents to a doctor of his choice, provided the doctor wants him and does not have more than 3500 patients on his panel. The doctor is paid 4.00 per year for each patient, whether he sees him daily or never. This doctor does not use the hospital, but sends patients to a doctor whose full-time work is in the hospital and who is paid a yearly salary. The patient cannot consult this doctor or go to hospital unless sent, except on his own responsibility.

The advantage of the program is quickly stated, because there is only one. But that one is enough to guarantee that this program will be permanent: The patient does not have to pay for being sick, a responsibility none wants to assume.

The disadvantages are more numerous; the high cost is the most significant. The cost is infinite and uncontrollable! Administrative and hospital expenses are enormous. Hospitals are over-utilized, crowded and out-moded. For 14 years no new hospitals have been built. The waiting list for elective admission to hospital is in some cases two years. This has caused a sort of "black market" in which a patient wanting a hernia repaired, for example, will pay the cost so that it can be done immediately in a private clinic rather than wait for government facilities. This is not illegal but it is embarrassing to the government.

Personal care by the physician and liaison between the doctors have deteriorated. The doctor now has no incentive to give comprehensive care and uses hospitals far too much. Doctors are emigrating from Britain at every opportunity.

The general practitioner is not satisfied, and his professional and financial status is poor. The way the program is organized puts a premium on inferior medical care. There is a shortage of physicians. There is no way for the good doctor to make a better income than the mediocre one. There is a decline in interest in government medicine on part of patients. Purchase of voluntary health insurance is rising rapidly in Britain.

The major cost of this vast womb-to-tomb insurance program is hidden in taxes. It is becoming an insupportable burden on the British economy. But no politician would dare suggest a change.

GERMANY

All over Europe they are telling the story of the Russian sputnik which meets the American satellite in outer space and says, "There's nobody out here but you and me, we can go ahead and talk in our native German." The world knows that German minds built both those machines and that Germany is the peer of any nation in science. In addition to their scientific ability, the Germans have another quality: They are the best-disciplined people in the world. All the countries they occupied during the war confirm that fact and agree that their soldiers were much better disciplined than ours. No rape or looting for the Germans.

Germany was the worst-destroyed country in Europe and is now the strongest. It has the longest work week in Europe. The

number of doctors produced in Hitler's reign was three times the normal rate. Since the time of Chancellor Bismark, German medicine has been socialized.

Germany is now two separate nations.

EAST GERMANY represents the ultimate in socialism. The deplorable status of health care in East Germany is illustrated by the fact that when I was there last fall there was not a single pediatrician in the city of Leipsig. Leipsig is one of the oldest university and cultural centers in the world. It is a town of 600,000 people. Doctors have emigrated to West Germany, as have all professional groups.

Medical care is not prospering. In view of the Germanic qualities of discipline and scientific achievement, and of the adequate supply of doctors, what else can be blamed but the intensely socialized system? Competing political parties have granted one increase after another in social welfare benefits, which, despite incredibly high taxes, are not covered by income. Doctors are paid according to a system that encourages inferior medical practice. Mortality of the newborn and maternal mortality are the worst in the western world. All services are over-utilized as everybody wants "something for nothing," hospitals are crowded and bankrupt. Doctors and patients are dissatisfied, but the public wants no reform that does not include the "free" principle.

NETHERLANDS

Holland was once a pastoral meadow, a great colonial power, a center of culture, and a haven of religious freedom. It is still intensely agricultural, but is now also intensely industrial—containing the largest oil and electronic industries in Europe. It has lost its colonies, the last one to go being Indonesia—the world's richest area and exploited by the Dutch for 300 years. The many Puritans and Jews who live there have made Holland a sober, conscientious, and cultivated nation.

The Dutch fought the Germans bitterly in World War II and lost three times as many dead as the United States. The constant struggle against the sea has given a serious face to the national character.

It is the longest-lived country in the world, with lowest death rate and best maternal and new born health records. Most deliveries are done in the home, 40 per cent by midwives.

Half the population is insured by a compulsory program, 2 per cent of employee's salary paid by himself and another 2 per cent contributed by employer. Most of the remainder of the population belongs to private insurance groups. The distinguishing feature of Dutch medicine is that control of all phases of medical care, even public health and government subsidized activity, is largely in private hands.

We doctors in America get poorer results than do the Dutch midwives. Reason: nature of the people. They are scrupulously clean, conscientious, come in for check-ups as ordered. The Dutch have no problem with primitive people as in United States and Southern Europe. It is not economics but character that produces good medicine in the Netherlands. Holland is a poor country.

SCANDINAVIA

If a world-wide popularity contest was held today the winners unquestionably would be the Scandinavians. A cynic might say it is because Scandinavia is too small for jealously; too remote for antagonism. That is true, but the real reason is that the inhabitants of Denmark, Norway, and Sweden are attractive. Other traits they share are a related history of struggle in a cold climate, and the oldest socialist governments in the western world. They do not understand our system of capitalism, but they love our country. There are more Swedes in Chicago than in Stockholm; more Norwegians in New York than Oslo; and there is Danish blood in the veins of most people claiming English descent.

In contrast to the puritanical Dutch, the Scandinavians have a religious attitude that can only be compared to the ancient Greeks. The tax-supported church gets little from the people in the way of tithe or time. While professing the same creed as we do, they do not turn out in great numbers for church on Sunday. So far as

their practice of Christian ethics is concerned, they are the equal of any of us. Their sexual mores are more liberal, particularly in Sweden.

One will search Scandinavia in vain for a low class—a condition attributed by the citizens to their social system and by me to the nature of the people. Call it what you will, heredity or environment, but this is a hardy breed. Why then are they socialist? I can only suggest that they have had a highly-organized society for a thousand years, whether in Viking crews, fishing fleets or merchant navies. Until recently they have been poor; and they banded together a hundred years ago in voluntary insurance societies against disease, or failure to return from a sea voyage, or other hazards faced in a harsh climate and a poor land. From this early association for "social security" the step to government management has been a short one.

These countries are socialist to the core, and have been for so long that their socialist governments are actually cautious and responsible, and have even undone some of their socialism on occasion in the interest of efficiency.

Scandinavia is the home of the welfare state and doing a good job of it. Why does it work so well? There are several reasons: small size, low population density, a highly literate, industrious and civilized people, a homogeneous national origin, no racial, religious or ethnic division. This enables them to discipline the system. They don't take advantage of it. There are no pressure groups to ask for special favors: anyone defrauding the operation is severely punished. The people don't ask more of the program than they put in it, and they accept its limitations. They are satisfied to have less than the restless American. Their social system is unique in that the people contribute a large portion of the cost usually through direct payment at the time of treatment in addition to insurance (Norway and Sweden). This is in distinction to Great Britain and Germany, and probably to United States if socialism comes here. In other words, Scandinavia is actively on a rather sound basis. It is not all good though.

What are the limitations of the Scandinavian Socialist System? Highest taxes in free world; less productivity, less freedom of capital, less opportunity, less reward for the hard-working, the ambitious and the bright, a restricted economy, a shortage of capital. Example: housing shortage all over Scandinavia, even in rich Sweden. Nobody in Scandinavia has to work (the government will support him) but most of them *do* work. Three weeks mandatory vacation with pay is law. It is impossible for the average man to build up any savings. Taxes are incredibly high. One doesn't "get ahead." For what it is worth, I suggest an interesting corollary of this condition. Although America is a richer country and everybody has more, there is possibly more anxiety (so called insecurity) here than in Scandinavia. While I feel that one cause for this lack of work satisfaction a contributing cause, is that in America everybody wants to "get ahead." In Scandinavia a man cannot "get ahead." There's no where to go. So, he doesn't worry about it. The Jensens can't get ahead of the Olesens, so the Olesens don't worry about getting ahead of them. Instead, the Scandinavian reads, has a leisurly chat, goes hiking or skiing and lets simple pursuits fill his days with contentment.

One other point: They all work; there are no loafers. But the pace is not as fast as here. They don't have as many people doing nothing as we, nor do they have the highly-charged economy that produces, at the opposite pole, the hard-working business man characteristic of America.

NORWAY

In a world ever becoming more modern and effete, more urban and crowded, Norway provides a welcome escape. Norge (pronounced Norr-guh) is a thousand-mile strip of mountains, split by long fingers of the ocean, and inhabited by a people combining the attributes of the mountaineer and the seaman. Their greatest asset is space: a scant 3½ million of them enjoy the lowest population density in Europe, in a

country the size of California, but with one-fourth the population. It is the most sea-going nation in the world and its towns look like the United States of fifty years ago. They are the most out-door people in the Northern hemisphere.

Add to those features a severe climate, saved from barrenness only by the blandishments of the Gulf Stream, and a heritage of Vikings, and you can imagine a distinctive race.

Isn't it odd that these self-reliant, and individualistic people should produce the most socialist state outside the Iron Curtain? But, consider that only 4 per cent of the land is arable, that mountains tilt up the land, pushing the men to sea to earn a hard living, and that this united people have inherited a tradition of group action in a thousand years of sailing, and then socialism seems more logical.

The poverty they have known until recently must also be considered. Norway is still a poor country, but of free men. They fought an epic struggle against the Germans.

About 1850 voluntary insurance groups were formed; they grew and coalesced. In 1910 compulsory insurance for low income families became law. The income limit has been raised gradually and since 1956 compulsuory insurance has included all people living in Norway. If you go to Norway and fall sick you will be cared for at no cost.

The Norwegian is insured against everything, but not for the full amount of many charges. He must pay some of the cost depending on the nature of the service. After the first two visits to the doctor, ¾ of the cost of medical care is paid by the insurance program. Accidents and illnesses associated with work (fishing, sailing, timber) are covered entirely by the state as are certain long term diseases such as tuberculosis and mental disease.

Hospital care is free. Private hospital care costs extra. The cost of drugs is borne mostly by the patient. Maternity care is covered. The midwife or doctor charges usual fee and 2/3 of cost is remitted by the State. Half the deliveries are by midwives.

Wage-earning beneficiaries are also paid cash sickness allowance for any illness lasting more than three days. If death ensues a funeral allowance is paid.

Cost of the scheme:

1. Premiums pay half of cost. They range from 15 cents a week paid by students to 75 cents a week paid by over half of the working population. Premium is deducted from pay of wage earners; others, including unemployed, are required by law to make their own payments weekly.

2. 30 per cent paid by employers.

3. Remaining 20 per cent—divided between national and county governments. So only 20 per cent is paid by general taxes.

The Norwegian doctor is paid on a fee-for-service basis according to a fixed schedule, a system different from England (capitation) and Germany (number of sick cases he handles). One quarter of cost is paid by patient at time of illness.

The result of this womb-to-tomb program is pleasing to patients. Taxes are fantastic; highest in the free world. No one builds an estate. Except for the shipping families there is no wealth in Norway. But, living seems to be as much fun there as it can possibly be.

The scenery is unsurpassed.

DENMARK (*Spelled Danmark locally*)

An agricultural land jutting from Germany into the Baltic Sea, and separated from Sweden by four miles of water. The best-liked people in Europe by the Europeans, they are gregarious, consume more beer than anywhere in world, sophisticated, urbane. They travel widely and settle everywhere and are very quick to adjust to any people or any custom. Copenhagen is an international city—tourists from everywhere. Oslo and Stockholm are not.

Taxes are confiscatory and although there is nothing left after paying for it, they like their welfare state.

Pre-payment of medical care began a hundred years ago as voluntary societies for

sickness benefits. The program was and is administered by private companies, but now there is government subsidy. Administration costs of private companies are much less than that of government-administered portions. Insurance is not compulsory (in contrast to Norway).

5 per cent of population—classified as indigent, Government pays.

85 per cent of population—pay a monthly sum into insurance Company up to 16,000 K (2500.00).

All pay same sum. This covers 2/3 of their medical cost. 1/3 comes from taxes.

10 per cent pay their own way. May join an all private program if they desire. (above 16,000 K).

Unlike Norway and Sweden, the Danish patient pays none of the cost of his visit. The Norwegians and Swedes have patient-pay, 25 per cent of the cost to 100 per cent (in some cases, such as unwarranted night calls). There is friendly argument across the Baltic about the virtues of each method.

In Denmark patients cannot change doctors unless referred. Night calls are done on rotation service of younger doctors. They work strictly by appointment, do not answer telephone, and walk out promptly at 5:00. No emergencies are answered except by rotating call service. They do not work as hard as doctors in United States.

Doctors are paid directly by State on a fee-for-service basis.

Hospital doctors are paid by salary; 2-3 hours of private practice per week. Hospital admission is free; paid by tax income. The system is generally satisfactory to patient and doctor; like the others, it suffers from rigidity.

SWEDEN (*They call it "Sverige"*)

If the English are the most mixed-blooded of the Nordics, the Swedes are the purest.

The Swedish Saxons made fewer Viking excursions than their neighbors, and were protected by mountains and sea from invasion. Perhaps their remoteness explains the opinion of their Danish and Norwegian cousins that the Swedes are somewhat cold, distant, selfish, and unfriendly. This reputation was not improved by the events of World War II in which the Swedes got rich by the simple expedient of staying out, and allowed the German troops to pass through by train to subdue the Norwegians.

Swedish women are best-looking in world.

Sweden's chief difference from Norway and Denmark is that Sweden is rich. A hundred years ago Sweden was as poor as Norway and Denmark, and people migrated in great numbers to United States. But its hydroelectric power, iron ore and steel mills, automobile factories, and freedom from war have changed that picture. With Switzerland and the United States, it is one of three richest countries in world. Money is making the Swedes, like the Americans, effete, decadent, and soft. Sweden has a strong shipping industry with Norwegians and Danes outnumbering Swedes in crews because of higher pay than they can get at home.

The socialistic state is in charge in Sweden and evolved from private associations just as in Norway and Denmark.

The economy is heavily controlled and restricted. There is a severe housing shortage. The ambitious prefer the United States system and there is a growing free-enterprise party. Generally, however, economy is like other Scandinavian countries except richer. The medical care system is like Norway in that patient pays part of cost. Medical care is good, but not as convenient for patient as here. The patient does as he is told, since he has little alternative.

CONCLUSIONS

The chief difference between Europe and America is economic. The world-wide social revolution, in which capital and power are passed from the individual to the government, has progressed further in Europe. Medical care and insurance are one part of the general situation involving the total existence of a nation and its people.

The popularity of these social welfare programs is due to the belief that they are

free, since payment is always indirect. The average man likes having the responsibility for his welfare in other hands than his own. The price he pays is measured in confiscatory taxes, inability to accumulate savings, reduced opportunity, strong controls, and restricted economic freedom, lower productivity, and the danger of the tyranny that comes so easily when the government has all the money and all the power.

Aside from these auxiliary liabilities, I believe the system of government medicine is itself inferior and that American-free enterprise medicine is better.

1. European medicine is less productive and less efficient.

2. The United States leads in medical research.

3. European doctors who have studied here are filled with admiration for our system.

4. There is more medical care available in the United States.

5. Federal medicine cannot be controlled in a democratic country. Costs will become ruinous, or Government too strong.

6. Abuse of the system is unavoidable and uncontrollable.

7. No one body should be allowed to acquire a monopoly in medical care. This places the doctor at the mercy of forces which may have no interest in, or sympathy for the personal and confidential relationship that ought to exist between doctor and patient.

The only alernative to federal control in the United States is preservation of voluntary pre-payment plans. Otherwise another segment of our economy will slip into government ownership.

This is an awesome responsibility for the insurance industry.

OUR MUSCLES

KENNETH M. CORRIN, M.D.*

Good muscles are important for the maintenance of health. They are the largest functional organ in the body and "complete almost one half of the weight of the human body"—Fulton's Physiology. They are found in every organ and tissue, carried there in blood vessel walls. Muscles are of great importance in the oxygen-glucose metabolism and the blood vascular circulation of the body, especially in pumping venous blood back to the heart. Physical and mental health, personality, organ function and entire well-being depend largely on healthy muscles. One cannot have soft flabby body muscles and expect to have a good heart muscle, good blood vessel muscles or good stomach muscles. The state of muscle tone is especially important in the sick and in the aged.

Some examples of the harm of muscle inactivity are the following:

In fattening livestock, confining to prevent exercising plus over-feeding, results in increased fat deposits in and around the muscles as seen in the marbling and fat layers in prime beef.

Monday-morning sickness in horses was a common condition in big draft animals formerly used in the brewery trade. When these large heavily muscled, heavily fed, active horses were left tied in their stalls over long week-ends, they often developed paralysis of the hind quarters with blood in the urine due to impaired carbohydrate metabolism. Placed in a large corral where they could exercise freely, this condition was avoided.

The Monday morning malaise which many men and women experience is apparently similar, resulting from over-eating, often with over-indulgence in alcohol and tobacco, in the absence of the usual daily exercise obtained at work.

Impaired carbohydrate metabolism of muscles is a common cause for many men and women feeling toxic, sluggish and half sick without knowing what is wrong. When more food is eaten than is necessary, with a deficiency of muscle activity and oxygenation, the excess glucose circulates in the blood stream impairing the smooth functioning of every organ in the body, eventually to be stored as fat. The onset of this subacute toxic state is often so gradual and insidious that it is overlooked by both doctor and patient.

Sudden hear failure, often in men in their fifties, is relatively common today. Many of these patients, apparently in good health, fail to show definite thrombosis or other pathology in coronary arteries sufficient to cause death. A preceding heavy meal, slight exertion, or a chronic fatigue state are common in such histories. One cannot but wonder what part lack of exercise, poor muscle tone including the heart muscle, plus chronic fatigue play in such deaths. Some of these deaths are probably preventable by paying a little more attention to the general health, maintaining good muscle tone by proper exercise and the avoidance of chronic fatigue.

The retired business man who does not have a definite exercise program but sits about most of the day frequently develops muscle pains, rheumatoid arthritis, indigestion, constipation and general malaise. If this condition is not corrected he may not live long. When such a person eats less, takes regular exercise to keep his weight down to normal and keeps his mind active, he soon corrects the condition. The person confined to bed with a prolonged illness such as heart disease, without passive motion, massage or exercise of any type, often

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arises to find himself so weak that he can hardly stand alone. This is not a question of equilibrium but of muscle weakness from disuse. Urologists have long known that body or leg casts, applied for long periods to prevent movement, tend to produce urinary calculi. The recumbent position for long periods also tends to favor thrombi formation.

How can the middle aged person keep the weight down, the muscles in good condition and all the organs functioning at their peak of efficiency? There are several basic principles which may be utilized when one begins to feel the need of special attention to this phase of health.

Diet of course, is important, not so much what is eaten as how much. Here the "platter method" usually obtains the best results. With the beginning of each meal the person should stop and think—"How much and what kind of food does my body need?" Only that amount should be put on the plate and eaten. Of course there should be no eating between meals or at bedtime, and a minimum of fats and carbohydrates is essential.

Daily exercise such as walking in the fresh air is important. Walking leisurely with the mind and body relaxed, free from ension, is probably the best all-around exercise for the average man or woman. Every opportunity should be taken to walk short distances rather than ride. Many benefit from a short walk before retiring. For the sedentary office worker, when practical, walking to and from work is a good rule. For the recuperating patient or the retired person, a 20 minute walk may be taken before breakfast and an hour again before the evening meal. A few vigorous calisthenic exercises in the morning with deep breathing are favored by others. Naval men, confined on shipboard for days at a time, keep their muscles in condition by walking about the deck for a half-hour daily, breathing deeply and flexing and relaxing all of the large muscle groups of the body under voluntary control. The retired person with plenty of time may combine daily sunbathing with resistant exercises, flexing and stretching and self massage. Body massage by a professional, combined with ultraviolet ray therapy, may be taken regularly by those who can afford the time and money. The person confined to bed may systematically flex and extend, or raise and lower the extremities. The Sandow (vibratory) exercises, are ideal. This consists in raising an extremity, preferably while lying down, and flexing and extending in a series of short jerky movements, rather than the flexion or extension in one long sweeping movement. Massage with passive, resistant and vibratory movements should be an important part of the doctor's therapy for all patients confined to bed for more than two or three weeks, especially hospital cases.

Hobbies involving walking and other forms of muscular activity are helpful in maintaining muscle tone. A Turkish proverb says, "Dreaming goes afoot but who can think on horse-back." Horse back riding, hunting, fishing, tramping, geology, paleontology and botany are examples.

Systematic rest periods should alternate with work periods to keep muscles in good tone. Fatigue, the result of insufficient rest, often leads to nervous exhaustion with depression. The best preventive is mid-morning and mid-afternoon rest periods, or a rest period lying down after lunch. For the one who cannot rest after lunch a short rest before the evening meal is a good substitute. It is only when one is lying down, relaxed, that the heart muscle has an opportunity to rest. Evenings should not be filled with activities. To entertain friends, play cards, attend a dance, or the theatre is good rest for the mind but not for the heart muscle which must continue working full time. One should avoid keeping on the feet and going every minute of the day. Learn to relax and rest periodically. Living in a mechanical age produces sedentary habits which, for most city dwellers, makes planned exercise necessary for good health. Physicians, as a rule, should give more attention to the care of their patient's muscular systems, as well as their own. For good muscle tone, free from tension and fatigue, one should have eight hours of sleep, an hour of mid-day rest lying down, three regular well balanced meals daily and 24 hours of fresh air.

PRESIDENT'S PAGE

By the time this message can be published, the Medical Society of Delaware and the Delaware State Medical Journal will have moved to new offices in the Academy of Medicine Building. We hope that this will be a permanent home for our headquarters and for the Journal, which in the past forty years has been issued from the duPont Building, Citizens' Bank Building, North American Building, and 621 Delaware Avenue. The Journal plans to cover the new building in a dedication issued this fall, but we hope that many physicians will have visited it before then.

Delaware's Medicare contract was renewed this April in exercises of the authority granted the Council by the House of Delegates. The present Medicare contract expires April 30, 1960.

As this is written, House Bill 211 is expected to pass the General Assembly, creating a Delaware Citizens' Council on Aging. The purpose of the proposed Council is to focus the attention of all segments of society to the problems of the aged, study these problems, and plan accordingly. Medicine will, of course, be among the groups represented on the Council. The Medical Society's Committee on Aging has considered and endorsed the proposal: the Chairman, Dr. Clarence J. Prickett, has written Governor Boggs offering the Society's cooperation in the Council's work, in whatever way the Governor feels appropriate.

Bertholon-Rowland, Philadelphia insurance agency, is now in its sixth year of underwriting a group accident and health plan for the members of the Medical Society of Delaware. We have recently received a summary of the first five years' experience from Bertholon-Rowland, and have written to each of the eighteen Delaware doctors who have received benefits under the plan, asking for an evaluation of the service the company has rendered. Our conclusion has been that Bertholon-Rowland has been administering our accident and health plan fairly and well. The company is preparing a follow-up solicitation for new members and for old members who wish to elect or extend coverage under this plan. While the Society does not recommend this policy over any existing county medical society policies, we do feel that our plan offers reputable and reliable insurance for those who wish it.

In accordance with the House of Delegates' expressed belief that Delaware's dispensing opticians should be supported in their fight for licensure, representatives of the Medical Society appeared at a public hearing to support Senate Bill 99, the Opticians' Licensing Act. Dr. W. O. LaMotte, Jr., Chairman of the Committee on Public Laws and Mr. Lawrence Morris, Jr. spoke in favor of the bill, with Mr. Gilbert Kirk, President of the Delaware Society of Dispensing Opticians. The bill was opposed by representatives of the Delaware State Optometric Association. At the time of this writing, the bill has been reported favorably by the legislative committee, but has not been voted upon by either house.

Five hospitals in Delaware, one from each community having a general hospital, have elected to participate in the two-way FM radio conferences for medical education, planned under the supervision of the Society's Committee on Education. The project has received a tremendous boost from a grant from Smith, Kline & French Laboratories. A program committee of Delaware doctors, representing each of the hospitals involved, met in May with Dr. Fred MacD. Richardson of the Pennsylvania Hospital's extension service and others, to determine subject matter, programming and scheduling for the series. Provided that equipment (some of it is custom-built) can be installed by October, the committee plans to begin the medical education broadcasts on a weekly basis during the academic year of 1959-1960. This is a project which we think promises tremendous benefits to Delaware doctors in the continuation of their education.

Since June is the end of the academic year and mid-point of the fiscal year, it is a good time to spend a moment of reflection on the situation of the nation's medical schools. As we know, our system of medical education is dependent upon the freedom of the medical schools from outside intervention. It is fair to say that each of us feels an obligation to his own medical school, and that the American Medical Education Foundation offers the best means we have for helping our schools. Each dollar contributed to the A.M.E.F. provides leverage for fund raising from other sources, as it gives concrete evidence of American physicians' support of their own schools. Every dollar sent to the A.M.E.F. and earmarked for any medical school you wish, goes in entirety to that school. The A.E.M.F. keeps nothing for expenses, bookkeeping or anything else. All overhead for the Foundation is paid by the A.M.A. Therefore, I urge you to contribute to the school of your choice, or to medical education in general, through the medium of the A.M.E.F. Your contribution can be sent directly to the American Medical Education Foundation at 535 North Dearborn Street, Chicago 10, or to the office of the Medical Society of Delaware, 1925 Lovering Avenue, Wilmington 6.

A. R. Shands, Jr., M.D.
President

MEREDITH IVOR SAMUEL, M.D., 1875-1959

President of the Medical Society of Delaware for 1939, Doctor Samuel was born in Providence, Pennsylvania and died in Wilmington. Active for years in the Delaware National Guard and Army Reserve Corps, he was a charter member and first State Commander of the American Legion. A veteran of foreign service in World War I, he was active in the Veterans of Foreign Wars as well as the Veterans Administration.

Doctor Samuel was untiring in his efforts to help the sick veteran and will long be remembered by those he befriended.

Editorials

THE CLINICAL LABORATORY

The role of the clinical laboratory and its relationship to clinical medicine frequently is the subject of discussion. There are physicians who criticize their colleagues for an overdependence on the laboratory in the practice of medicine. There are physicians who criticize the laboratory because of a belief that it is impossible to have needed procedures done at the proper time. And finally, there are laboratory technicians who believe that most doctors require all of their laboratory work to be done on an emergency basis and then never stay in the hospital long enough to obtain the results. These viewpoints are divergent and, for the most part, are unfounded on fact and can best be dispelled by an examination of some well known facts.

The clinical laboratory is of great help in the practice of medicine and surgery. Merely reviewing some of the important uses of the clinical laboratory in the treatment of heart disease, a very limited specialty of internal medicine, will show its great importance.

CORONARY ARTERY DISEASE

Coronary insufficiency resulting in angina pectoris or myocardial ischemia usually is due to a narrowing of a diseased coronary artery. Not infrequently, however, it may occur in people with relatively normal coronary arteries in whom there is a severe degree of anemia. This frequently is seen in elderly people with carcinoma of the ascending colon. In such instances, a simple laboratory procedure such as determination of the hemoglobin, red cell count, and hematocrit determination will point to the correct diagnosis and enable the physician to institute immediately the proper treatment.

In myocardial infarction, the laboratory is important in diagnosis and in determining the amount of tissue damage by procedures such as the white cell count and sedimentation rate. The serum glutamic oxylacetic transaminase (SGO-T) reaction is relied upon quite heavily by some clinicians in the diagnosis of myocardial inarction. An integral part of this diagnosis is the detection of coexistant diabetes. In this, the laboratory is most important.

In the treatment of myocardial infarction with the use of anticoagulant drugs, the prothrombin time is important both from the standpoint of over and under dosage. If a heparian type of drug is used, a coagulation time is necessary. Regardless of which anticoagulant is used, urinalysis is helpful in detecting early signs of bleeding from the urinary tract.

In the study of coronary disease as a whole, the blood cholesterol is of importance. Some investigators using the ultracentrifuge believe that there is a definite relationship between coronary artery disease and lipid molecules of a large size.

RHEUMATIC HEART DISEASE

In the diagnosis of rheumatic fever, the tissue reaction as manifested by the sedimentation rate, the white blood count, and the C-reactive protein are most helpful. Antistreptolysin and antifibrionolysin titers are more specific evidence of preceding streptococcal infection. When a rheumatic valve reaches the stage where surgery is of help, blood transfusions, the determination of electrolytes, and other laboratory procedures incident to surgery are most helpful.

SUBACUTE BACTERIAL ENDOCARDITIS

In the diagnosis of subacute bacterial endocarditis, blood cultures are most helpful and necessary. Determination of antibiotic sensitivity is a portion of this study. As in other conditions, the blood sedimentation rate will give some index of tissue

damage. This condition is usually accompanied by severe anemia.

HYPERTENSIVE CARDIOVASCULAR DISEASE

In this condition it is most important to rule out the few removable causes of high blood pressure. A general renal survey is always indicated which, in addition to urinalysis, includes PSP test and urea clearance determination. The most common removable cause of hypertension is a tumor of the chromaffin cells known as pheochromocytoma. In the past, the best method of demonstrating this condition was either to do a provocative test (one in which certain substances are given to the patient to bring on an attack of hypertension) or else to give the patient a medication that will reduce the blood pressure if the patient is seen during an attack. These tests are not too accurate and certainly are not without danger. At the present time, we are able to obtain bio-assay of the catechol amines. This method is considerably more accurate and necessitates only an examination of the patient's urine.

CONGENITAL HEART DISEASE

Most patients with cyanotic heart disease have polycythemia. The degree of this of course is determined by laboratory tests. In the technique of cardiac catherization, a procedure that is most important in definitive diagnosis, the oxygen saturation of the blood obtained from different chambers of the heart is most important in correlation with the pressures obtained from these same chambers.

THYROID HEART DISEASE

It has been known for a long time that under or over function of the thyroid gland can be the precipitating cause of serious heart disease. In the diagnosis of both over and under functioning of this gland, the laboratory is important. The basal metabolic rate, the blood cholesterol, the blood protein bound iodine, and the uptake of radio-active iodine are most important. If the diagnosis is made sufficiently early, these dysfunctions of the thyroid can be corrected in time to result in a complete clinical cure of the heart disease.

CONGESTIVE HEART FAILURE

It has been well demonstrated that congestive heart failure is associated with sodium retention. In our treatment of congestive heart failure, the loss of potassium together with the loss of sodium frequently result in severe side effects that are equally serious as the condition under treatment. It is obvious that the laboratory is of utmost importance in the diagnosis and treatment of these conditions.

HEART DISEASE OF UNUSUAL CAUSE

Several decades ago syphilitic heart disease was a common condition. It is a tribute to the laboratory and the laboratory working together with the clinician that this type of heart disease may now be considered one of the unusual types. The utilization of the laboratory in the diagnosis and treatment of syphilis is obvious.

The same may be stated to a somewhat lesser degree about tuberculosis. Tuberculosis was at one time a frequent cause of pericardial disease. The new antituberculous drugs plus the close cooperation of the laboratory has made this condition relatively uncommon.

Lupus erythematosis and amyloid disease are two of the uncommon causes of heart disease. Both of these conditions are diagnosed only by means of laboratory tests. The same is true of some of the other uncommon infectious diseases. Finally, the role of virus infections has long been neglected as a cause of myocardial damage; this important group of diseases will assume their rightful role in the cause of heart disease. This will be seen with the development of virus laboratories.

The above is a brief outline of the usefulness of the laboratory and the importance of laboratory examinations in the diagnosis and treatment of a small segment of patients encountered in medical practice. Should anyone object that the modern physician can not practice medicine without the laboratory, let us emphatically plead guilty. But, in addition, let us be thankful that we have excellent laboratories in our community.

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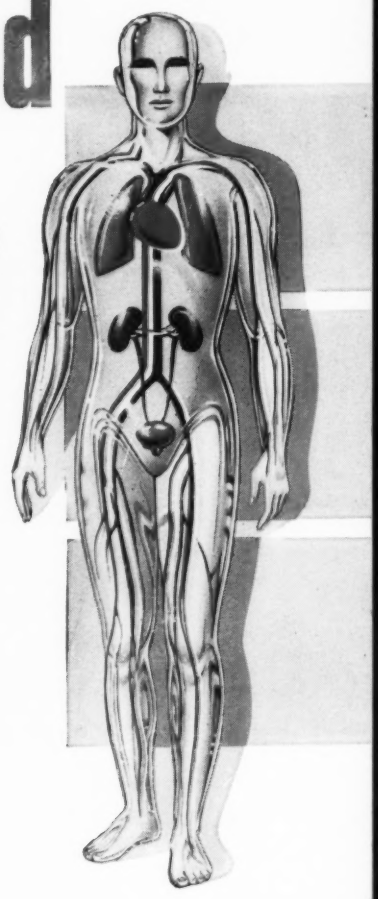

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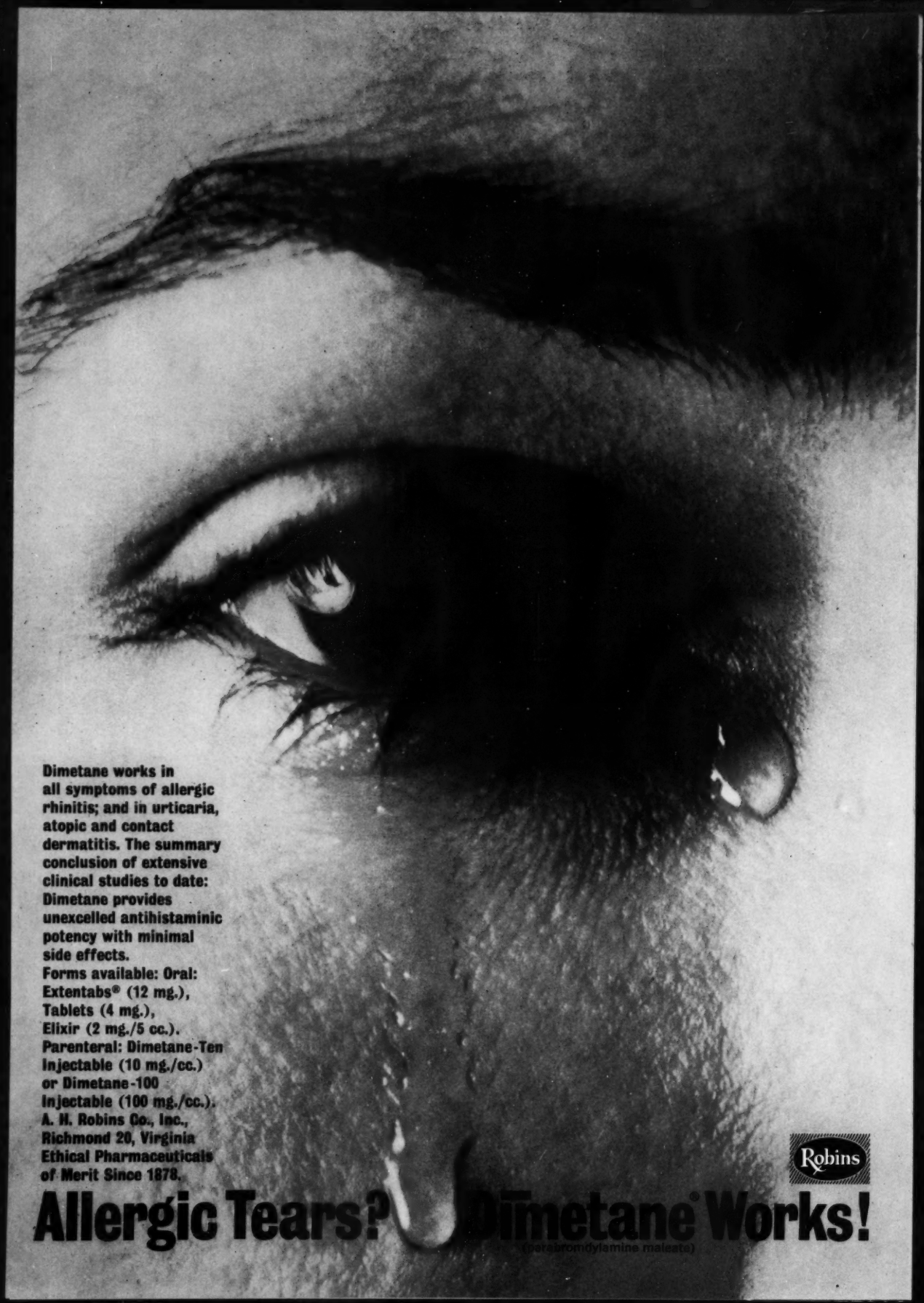
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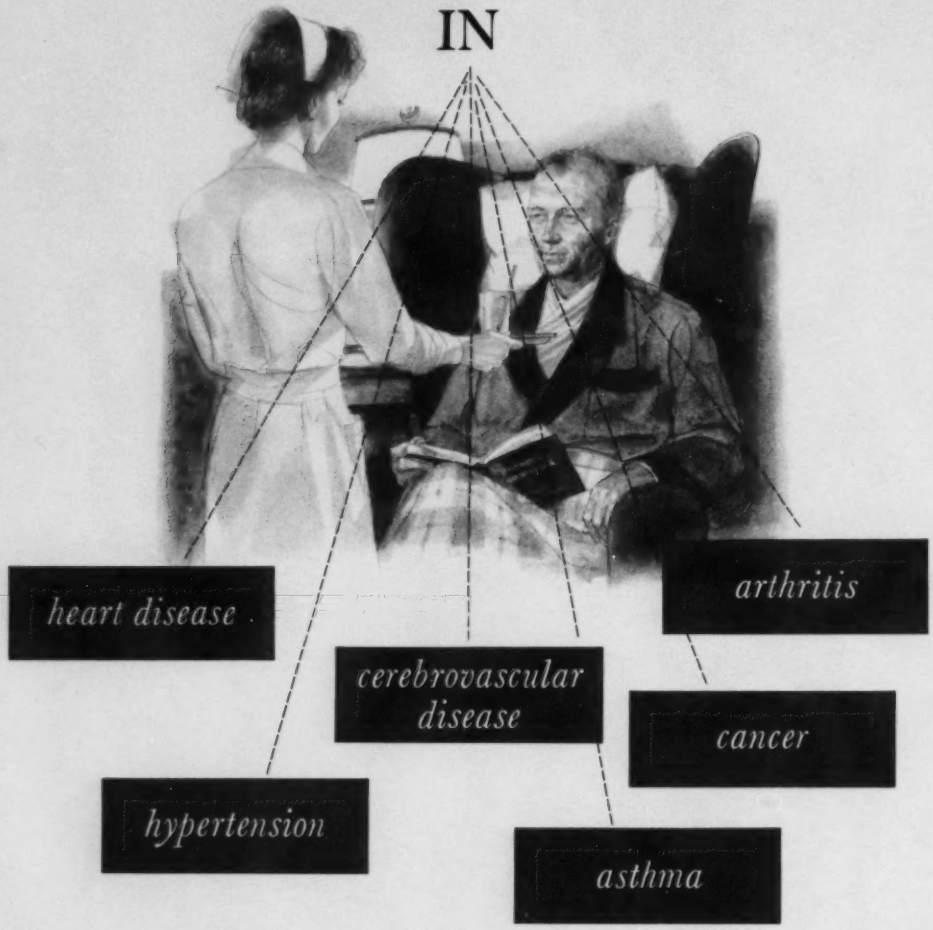

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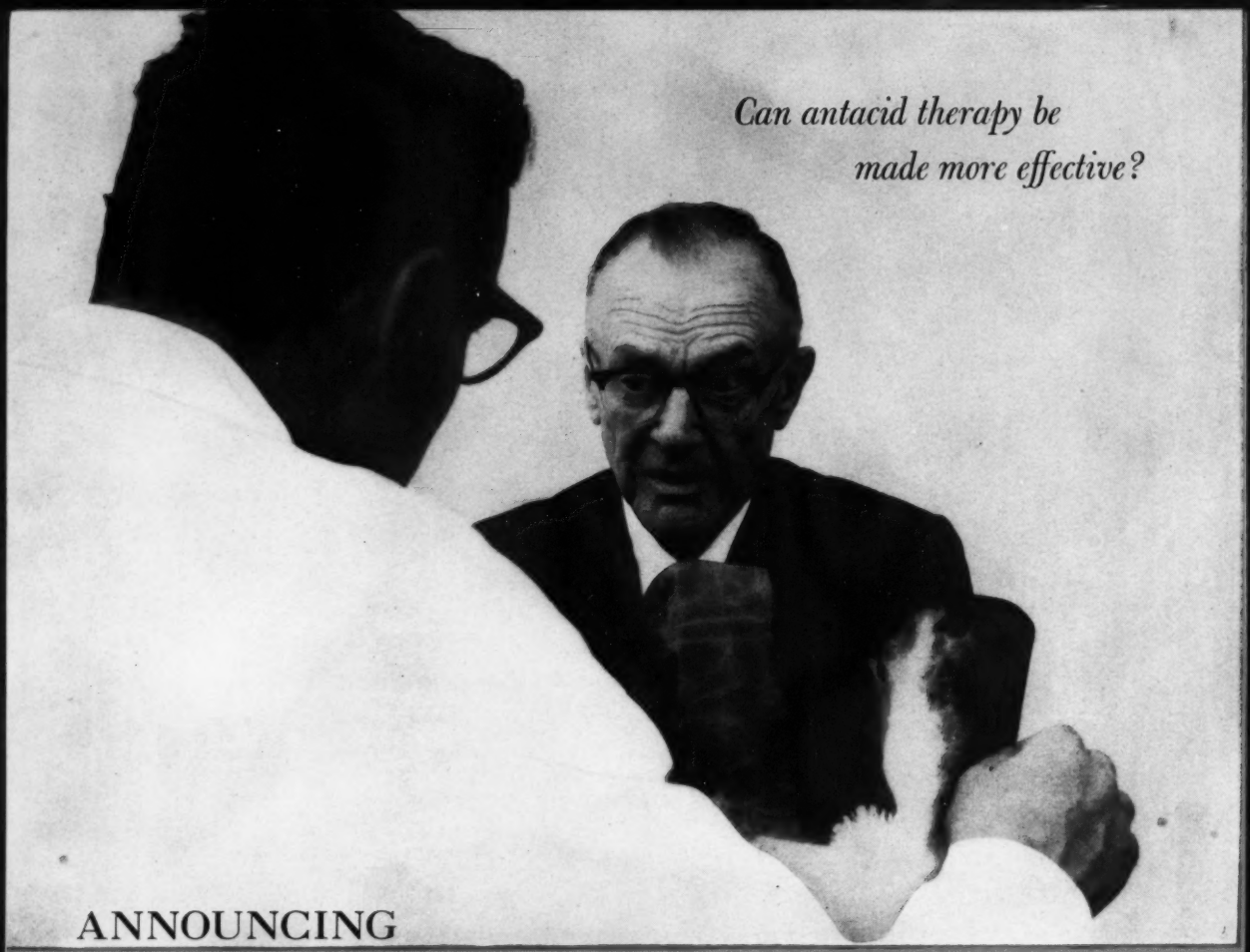

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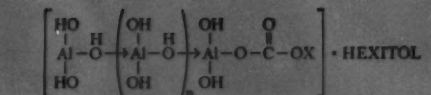

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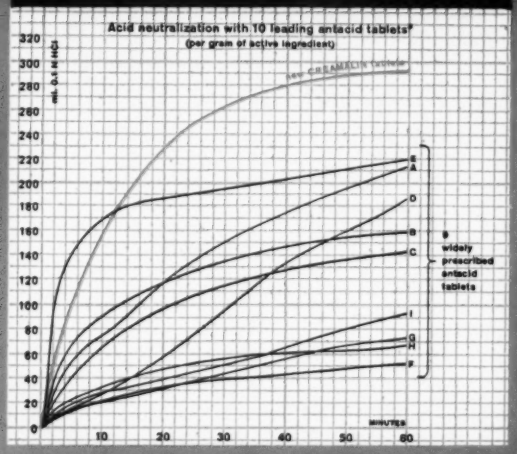

Tablets were powdered and suspended in distilled water in a constant temperature container (37° C) equipped with mechanical stirrer and pH electrodes. Hydrochloric acid was added as needed to maintain pH at 3.5. Volume of acid required was recorded at frequent intervals for one hour.

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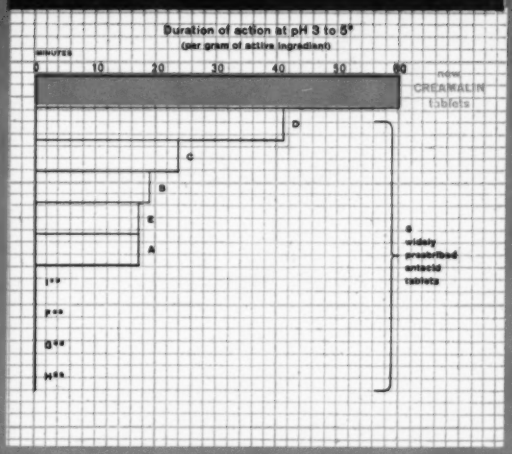
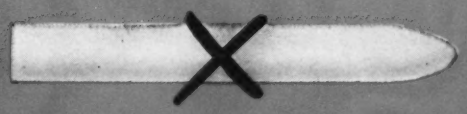


*Hinkel, E. T., Jr., Fisher, M. P. and Tainter, M. L.: A new highly reactive aluminum hydroxide complex for gastric hyperacidity. To be published.
**ph stayed below 3.



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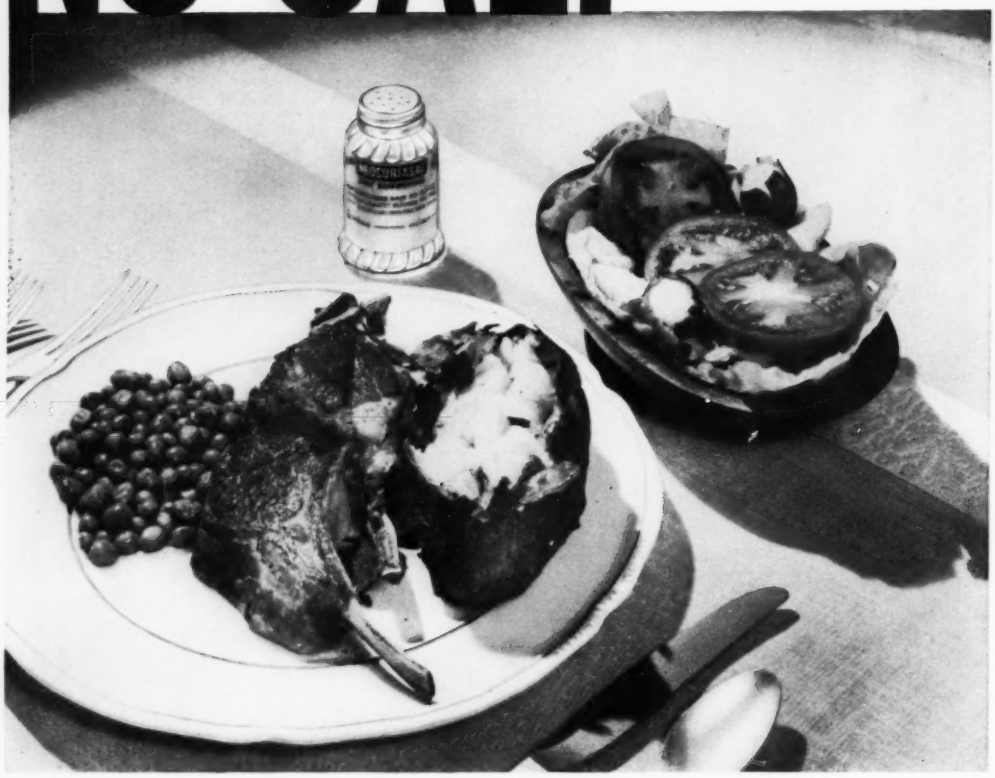

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References: 1. Sheldon, J. M.: Postgrad. Med. **14**:465 (Dec.) 1953. 2. Hubbard, T. F. and Berger, A. J.: Annals Allergy p. 350 (May-June) 1950. 3. Kline, B. S.: J. Allergy **19**:19 (Jan.) 1948. 4. Goodman, L. S. and Gilman, A.: Pharmacol. Basis Ther., Macmillan, New York, 1956, p. 532. 5. Fabricant, N. D.: E.E.N.T. Monthly **37**:460 (July) 1958. 6. Lhotka, F. M.: Illinois M.J. **112**:259 (Dec.) 1957. 7. Farmer, D. F.: Clin. Med. **5**:1183 (Sept.) 1958.

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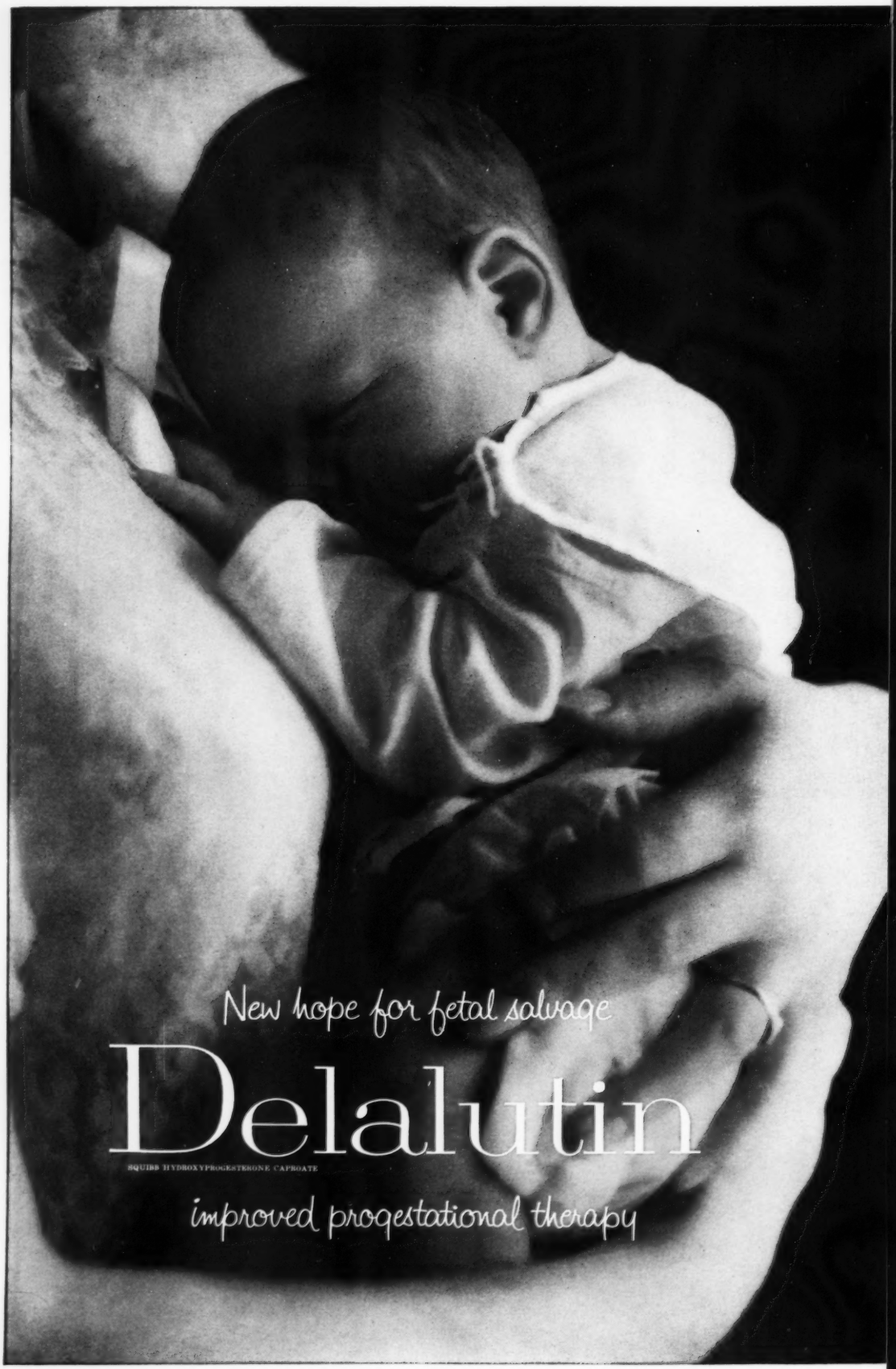
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References: 1. Reifenstein, E. C., Jr.: *Annals N. Y. Acad. Sci.* 71:762 (July 30) 1958. 2. Boschann, H-W.: *ibid.*, p. 727. 3. Eichner, E.: *ibid.*, p. 787. 4. Hodgkinson, C. P.; Igna, E. J., and Bukeavich, A. P.: *Am. J. Obst. and Gyn.* 76:279, 1958.

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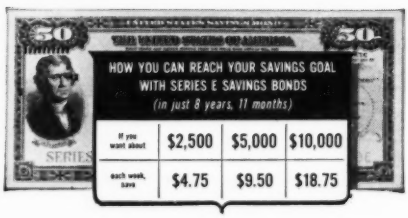

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